PATENT SPECIFICATION

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(72) Inventors DMITRY LVOVICH FEDJUKIN, LJUDMILA SEMENOVNA SERGEEVA, ANDREI NIKOLAEVICH BAKHAREV, INNA LEONIDOVNA GORLINA, ANATOLY IZRAILEVICH ARONOV, ARKADY TIMOFEEVICH KRAVETS, PETR EVMENOVICH KOROCHKIN and ALEXIE IVANOVICH TITOV

(54) METHOD OF FORMING A PAIR OF ARTICLES

(71) We, NAUCHNO-ISSLEDOVATELSKY INSTITUT REZINOVYKH I LATEXNYKH IZDELY, of 17 Pugachevskaya Ulitsa, Moscow 1, Union of Soviet Socialist Republics, U.S.S.R., a State Enterprise organised and existing under the laws of the U.S.S.R., do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a method of forming a pair of articles which are mirror-images of one another.

The invention can prove most useful when used in the manufacture of dies and moulds, especially in the shoe-making industry where it is necessary to produce a pair of articles which are mirror-images of one another.

There have previously been proposed methods of forming pairs of articles by means of tools of invariable shape, each of the tools being a three-dimensional copy of one of the articles.

To manufacture such tools, it is necessary that each of them should have its own profile shaped exactly to correspond with an article to be formed by the tool. For a pair of articles whose shapes are mirror-images of each other, e.g. for shoe moulds for right and left feet, two tools are required whose shapes are mirror-images of each other.

An object of the present invention is to provide a method of forming a pair of articles by means of a tool which permits the shaping of articles which are mirror-images of each other.

According to the present invention there is provided a method of forming a pair of articles which are mirror-images of one another, comprising providing a series of tool components each having a profile of a respective section of a model of one of the articles, securing the components together in a releasable manner in a first arrangement to form a first tool, applying the first tool to material to shape the material into the form of one of the articles, dismantling the tool and securing the components together in a second arrangement so as to form a second tool which is a mirror-image of the first tool, and applying the second tool to material to shape the material into the form of the other article.

The present invention allows the formation of articles which are mirror-images of each other by a method which is quick and easy.

If the articles are to be formed by electrical discharge or electrochemical machining it is preferable for the tool components to be made of graphite.

Owing to the high resistance of graphite plates, such a tool can be utilized repeatedly for producing articles which are mirror-images of each other.

An embodiment of the present invention will now be described by way of example with reference to the accompanying drawings, wherein:

Fig. 1 shows schematically a tool for use in forming articles by the method of the invention;

Fig. 2 is a cross-section of an article manufactured with the aid of the above mentioned tool;

Fig. 3 shows a tool model from which the tool of Fig. 1 was made;

Fig. 4 is a tool made from the tool of Fig. 1 by rearranging the components thereof in a reverse sequence;

Fig. 5 is a cross-section of an article manufactured with the aid of the tool of Fig. 4; and

Fig. 6 is a cross-section of an intermediate tool which is an impression of the tool model of Fig. 3.

A tool 1 (Fig. 1) for forming an article 2 (Fig. 2) to a profile corresponding to that of a tool model 3 (Fig. 3) is provided as a pack of tightly-fitting tool components in the form

of plates 4, each plate, e.g., plate 4 'abcdef' having the profile of a respective section or notional division, e.g. 'abcdef' of the tool model 3 (Fig. 3), corresponding to this plate.

To form the tool 1, the plates 4 are secured in a first arrangement $4_1, 4_2, \ldots 4_n$, this arrangement being dictated by the shape 'abghij' of the model 3. The tool 1 is dismantlable and the plates 4 may be reset in a second arrangement $4_n \ldots 4_2, 4_1$ (Fig. 4), this second arrangement being dictated by the shape 'jihgba' of a model on the tool 1 (Fig. 4), for forming an article 2_1 (Fig. 5) which is the mirror-image of the article 2 (Fig. 2).

The method of this embodiment of the invention is performed in the following way.

An intermediate tool 5 (Fig. 6) is cast from a polymeric material mixed with cutting particles to correspond with the tool model 3, which is of plaster. By imparting the intermediate tool 5 with reciprocating movement in three directions in contact with graphite substrate, the substrate is given a shape 'abcdefghij' of the electrode tool 1 (Fig. 1) and from the substrate thus shaped there are prepared the graphite plates 4.

Said plates 4 are secured tightly together and are braced by means of draw bars or coupling bolts or by some other suitable coupling. The resulting tool 1 is used to produce the article 2 (Fig. 2) by an electrical discharge, electrochemical, or combined electrical discharge chemical method, said article 2 being, for example, a die or a mould whose profile corresponds to the profile of the original tool model 3 (Fig. 3).

To obtain a tool which is the mirror-image of the tool 1, i.e. tool 1 'jihgfedcba' (Fig. 4), the plates 4 of the tool 1 are dismantled and reassembled as shown on Fig. 4, in a reverse arrangement $4_n \ldots 4_2, 4_1$ and secured together again.

The use of a tool made of graphite plates is preferable for electrical discharge or electrochemical forming of articles.

In some cases it is practical to make the tool of thin metal plates. Such a tool can be used, for example, for making an article and its mirror image by plaster or plastics moulding. A variety of dies and moulds, casting moulds and other articles may be manufactured by the method of the invention.

Thus, the method of the present embodiment helps mechanize the manufacturing operation of articles which are mirror-images of one another. The method permits quick production, to one original pattern, of articles having the same profile as the pattern and articles having a profile which is the mirror-image of that of the pattern.

The tool used in the method of this embodiment is simple in design and cheap to make. It is of particular use in the shoe-making industry for forming from one pattern moulds for manufacturing a pair of right and left shoes. This makes the shoe-making cycle shorter owing to a more rational shaping technique, and offers a greater choice of footwear in less time with due regard for demand and style.

WHAT WE CLAIM IS:—

1. A method of forming a pair of articles which are mirror-images of one another, comprising providing a series of tool components each having a profile of a respective section of a model of one of the articles, securing the components together in a releasable manner in a first arrangement to form a first tool, applying the first tool to material to shape the material into the form of one of the articles, dismantling the tool and securing the components together in a second arrangement so as to form a second tool which is a mirror-image of the first tool, and applying the second tool to material to shape the material into the form of the other article.

2. A method of forming a pair of articles which are mirror-images of one another, substantially as hereinbefore described with reference to the accompanying drawings.

3. A pair of articles which are mirror-images of one another, whenever prepared by the method claimed in claim 1 or 2.

FITZPATRICKS,
Chartered Patent Agents,
14—18, Cadogan Street, Glasgow, G2 6QW
and
Warwick House, Warwick Court,
London, WC1R 5DJ.

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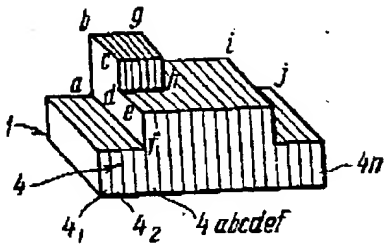

FIG. 1

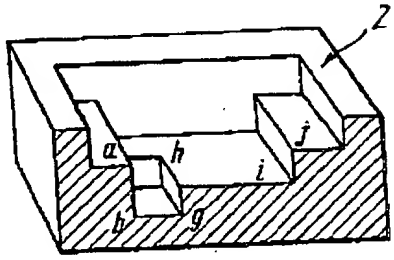

FIG. 2

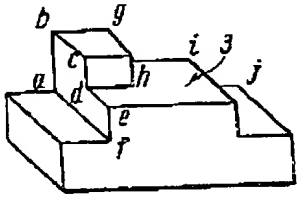

FIG. 3

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Sheet 2

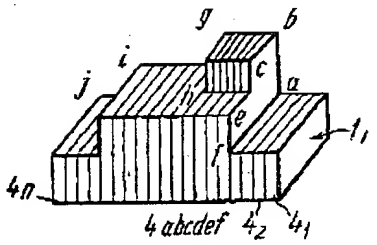

FIG. 4

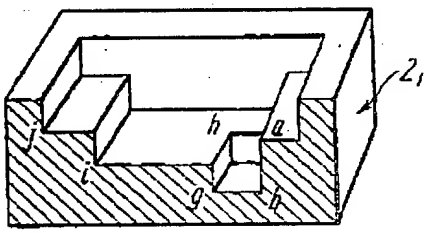

FIG. 5

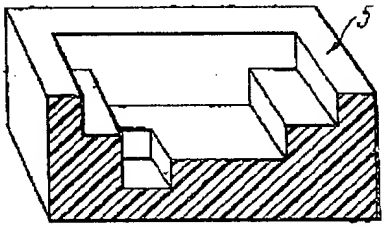

FIG. 6